June 22, 1965 J. W. LYNCH Re. 25,803

SLED ATTACHMENT FOR SUPPORTING MULTIPLE PURPOSE PLOWS

Original Filed June 3, 1959 5 Sheets-Sheet 1

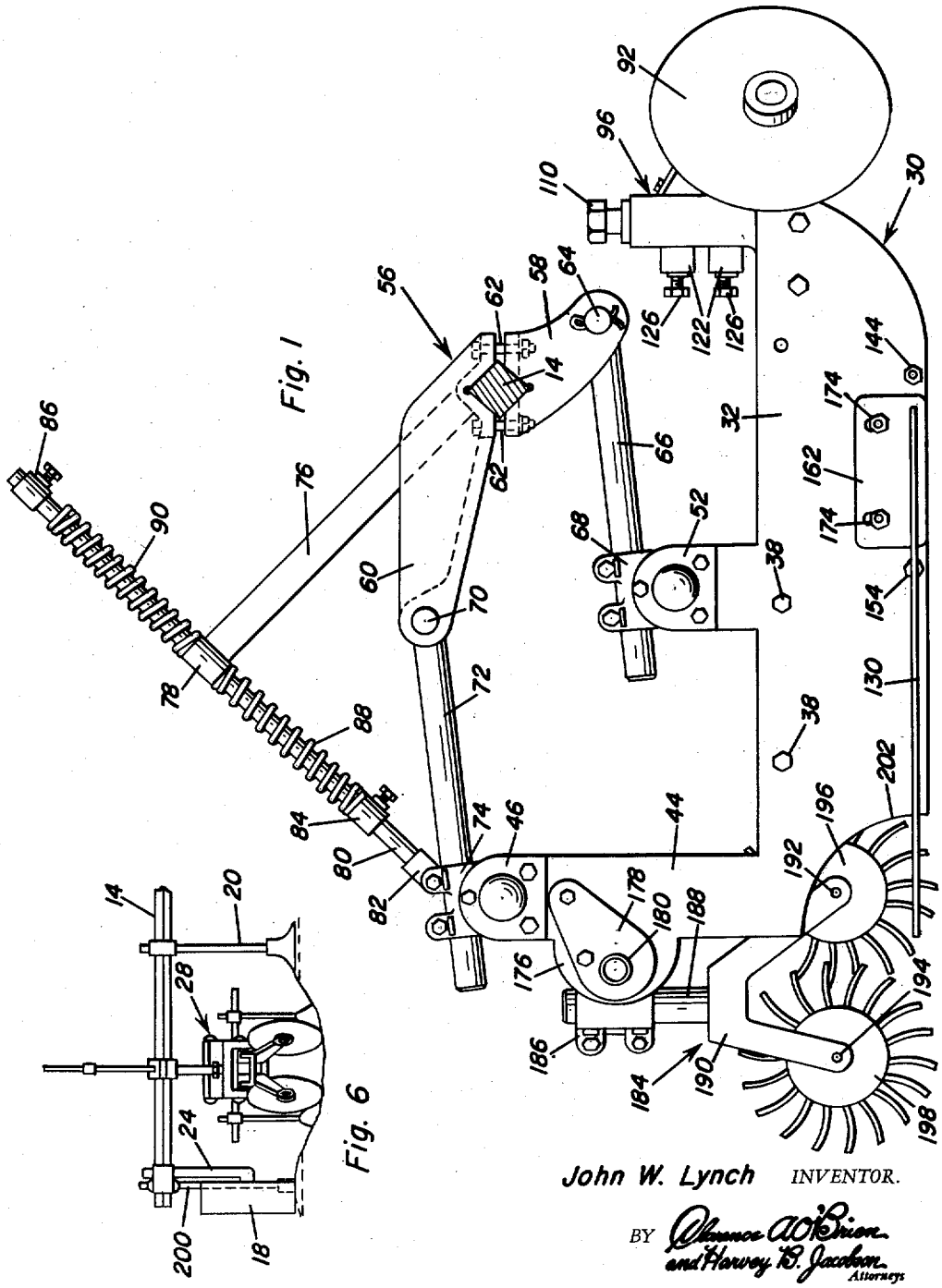


Fig. 1

Fig. 6

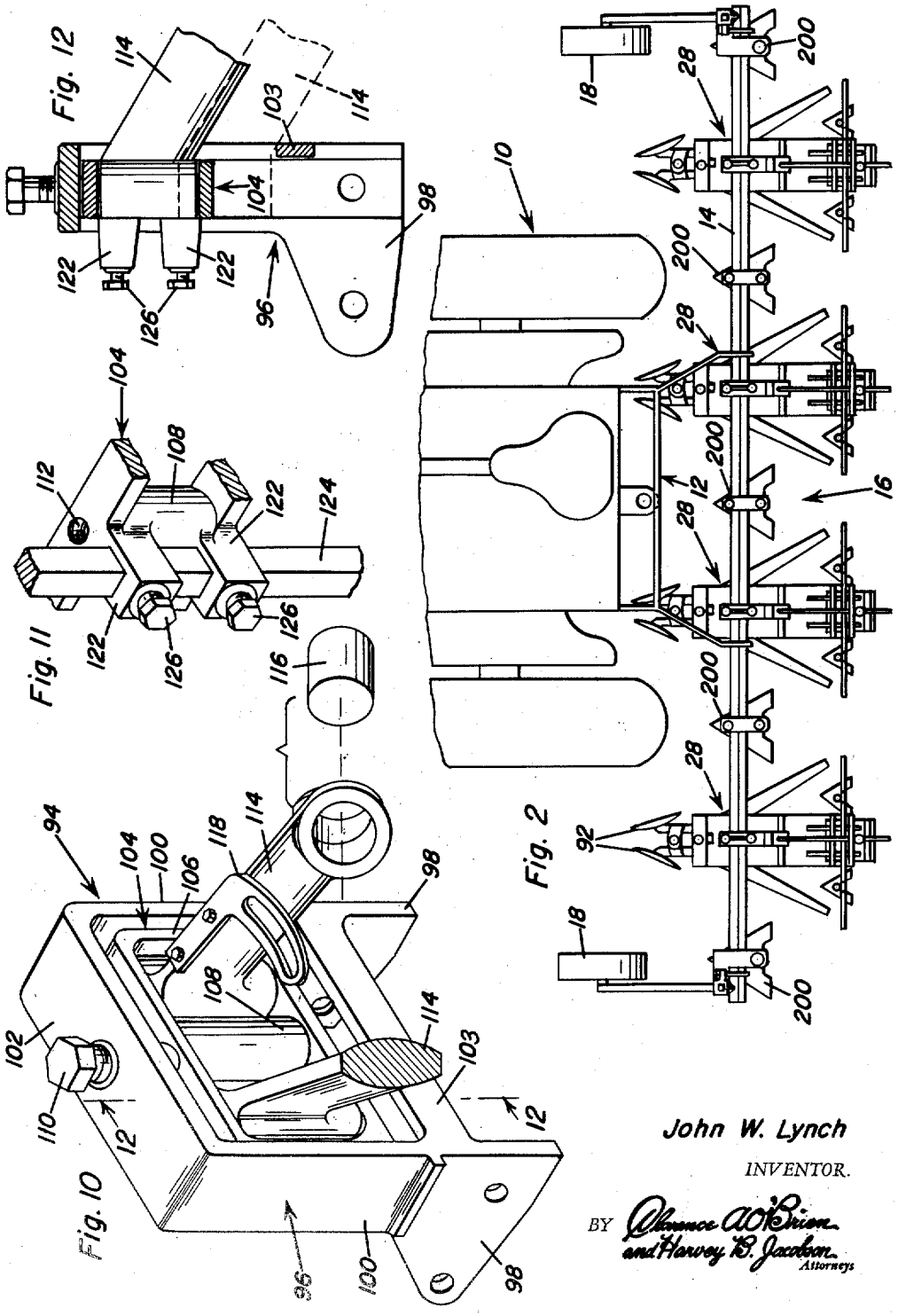
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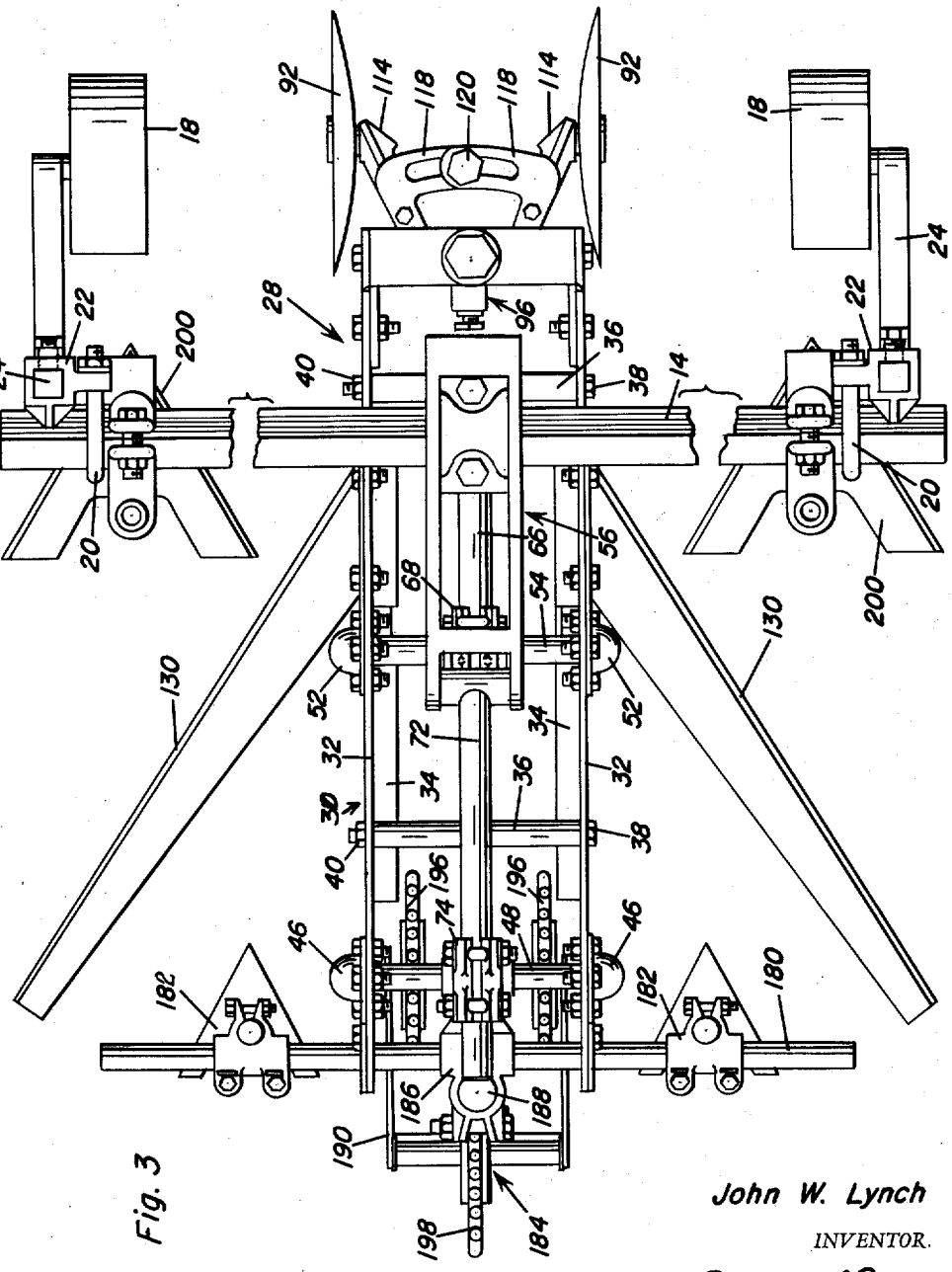


Fig. 3

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Fig. 4

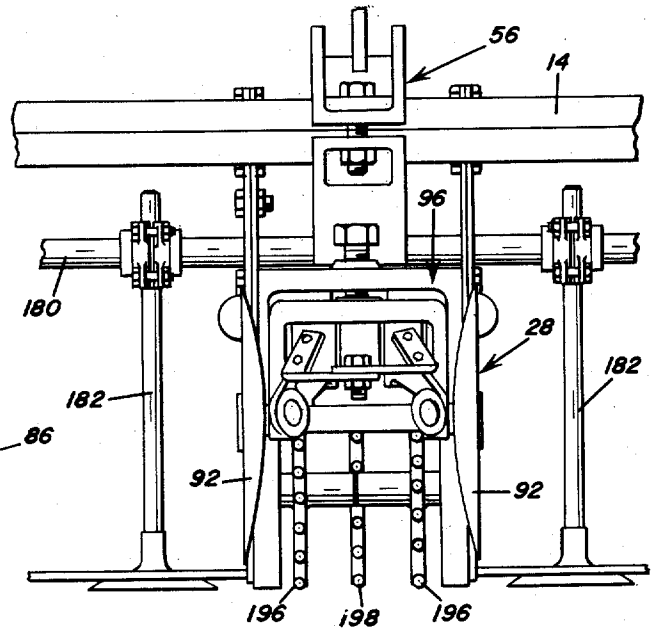
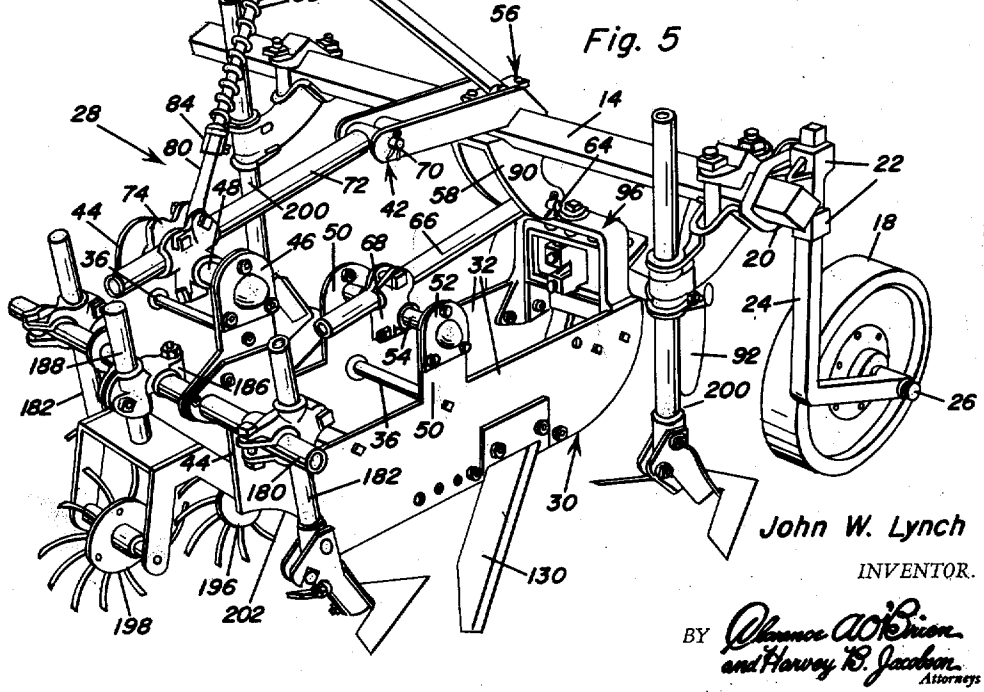


Fig. 5



John W. Lynch

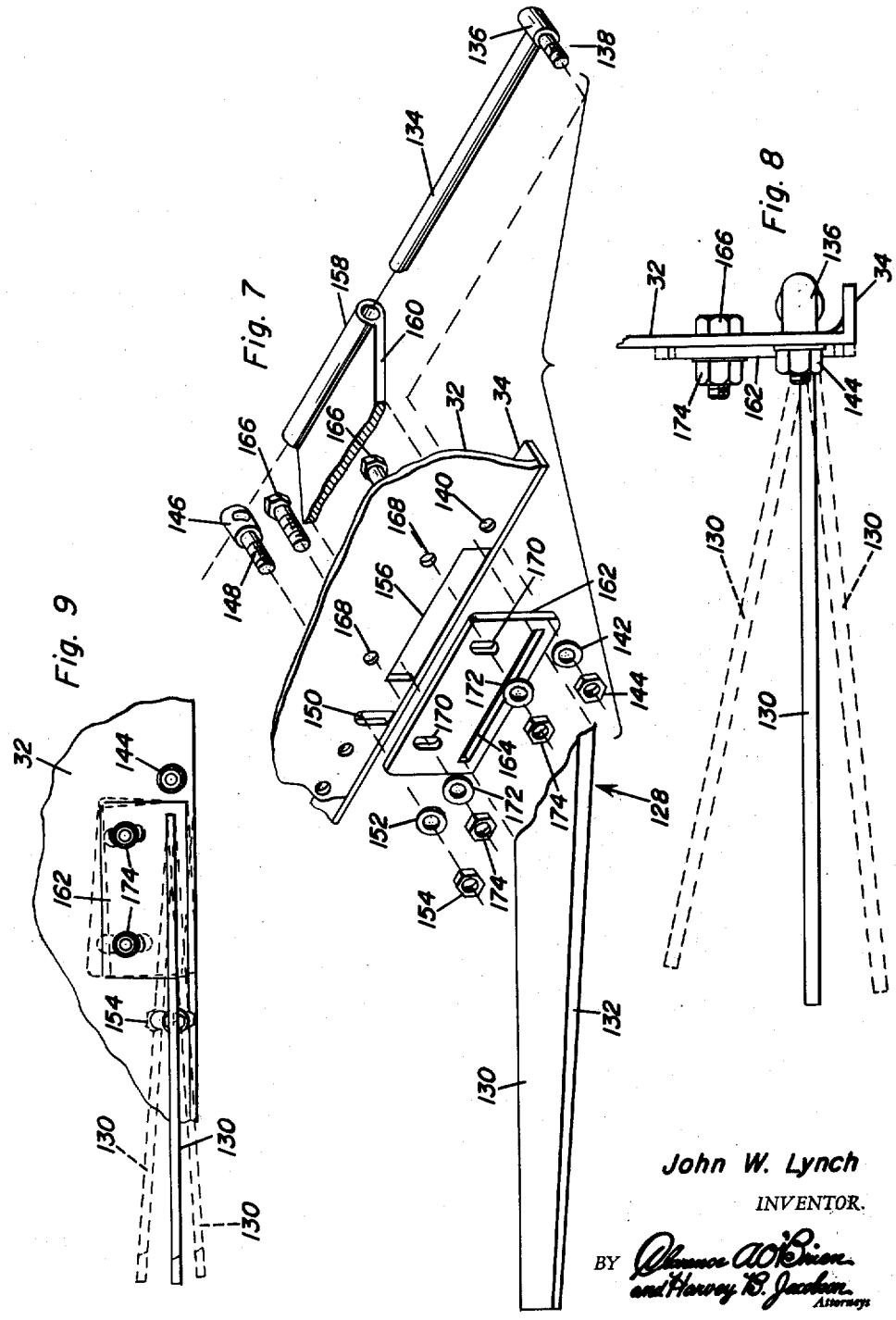
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25,803

SLED ATTACHMENT FOR SUPPORTING MULTIPLE PURPOSE [PLOW] *PLOWS*

John W. Lynch, Lubbock, Tex., assignor, by mesne assignments, to Randolph Manufacturing Company, a corporation of Texas

Original No. 3,052,306, dated Sept. 4, 1962, Ser. No. 817,849, June 3, 1959. Application for reissue July 2, 1963, Ser. No. 293,574

13 Claims. (Cl. 172—393)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates in general to new and useful improvements in agricultural implements, and more specifically to a multiple purpose plow.

In the conventional mounting of farm implements, the implements are mounted directly upon the tool bar of the tractor with the result that the implements do not individually compensate for the irregularities in the level of the ground. It is therefore the primary object of this invention to provide a plow unit which is of such a nature that each plow unit can rise or fall with variation in the level of the ground independently of the other plow units attached to the tractor tool bar, and in operation, the plow units will function simultaneously and provide for uniformity of depth for preparing beds, for planting, and for cultivation of the plants after a crop is up.

A further object of the invention is to provide a novel sled which may be mounted on a tractor tool bar for vertical movement relative thereto, the sled being provided with runners which will engage the ground and follow the contour thereof, the sled being provided with suitabe tool mounting means whereby the necessary tools may be carried by the sled to perform the ground shaping operations.

Still another object of this invention is to make use of the customary tractor tool bar in a novel manner. Normally the tractor tool bar is used for a direct attachment of tools, such as listers, knifing apparatus, etc. and the gauge wheels on the tool bar serve to lower or heighten the plow depth. The tool bar is usually 12 feet in length and when the individual plow tools are connected directly to the tool bar, there is uneven cultivation. In accordance with the object of this invention, the tools are connected to the tool bar for vertical movement independently of the tool bar so that the individual tools may follow the contour of the ground which is being worked.

A further object of the invention is to provide a novel linkage for attaching a tool carrying sled to a tractor tool bar, the linkage being of a parallelogram type and being spring-loaded whereby it is normally positioned with respect to the tool bar, but may be biased to offset positions above and below the tool bar and to have pressure engagement with the ground so that the sled will follow the contour of the ground during a ground working operation.

Still another object of the invention is to provide a novel plow which includes a sled adapted to be carried by a tool bar, the sled having means for mounting a coulter disk thereon, the mounting means of the coulter disk being capable of both vertical, *spacing* and angular adjustment whereby the coulter disk may be vertically adjusted or angularly adjusted to produce the desired ground working effect.

Still another object of the invention is to provide a novel knife assembly, the knife assembly including a sled having mounting means for attachment to a tractor tool bar, the knife assembly being mounted upon the sides of the sled for adjustment both about a longitudinal

axis and a transverse axis whereby the desired operation may be obtained with the knife by the proper adjustment thereof.

A still further object of the invention is to provide a novel plow assembly which includes a sled having means mounting it on a tractor tool bar, the sled being provided with attachments for mounting various types of tools including coulter disks, knives, cultivator plows, rotary hoes, and planters.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a side elevational view of one of the plow units, which is the subject of this invention, and shows the plow unit mounted on a tractor tool bar, only the tool bar, shown in section, of the tractor being shown;

FIGURE 2 is a plan view on a reduced scale showing a plow assembly utilizing a plurality of the plow units of FIGURE 1 and shows the same attached to a tractor by means of the tractor tool bar;

FIGURE 3 is an enlarged plan view of the plow unit of FIGURE 1 and shows further the details thereof, the gauge wheels for supporting the outer ends of the tractor tool bar being shown, intermediate parts of the tractor tool bar being broken away;

FIGURE 4 is a front elevational view of the plow unit of FIGURES 1 and 3 and shows further the details thereof;

FIGURE 5 is a perspective view on a reduced scale showing one of the plow units mounted on an outer end of a tractor tool bar and further shows the arrangement of one of the gauge wheels for the tractor tool bar and cultivator plows mounted on the tractor tool bar on opposite sides of the plow unit;

FIGURE 6 is a fragmentary front elevational view on a reduced scale of a plow assembly and shows one of the plow units in a cultivating operation;

FIGURE 7 is an enlarged exploded perspective view showing the mounting of one of the knives with respect to a side plate of the plow sled;

FIGURE 8 is an enlarged fragmentary front elevational view showing further the details of the mounting of one of the knives with respect to a side plate of the sled, adjusted positions of the knife about a longitudinal axis being shown in dotted lines;

FIGURE 9 is a fragmentary side elevational view of the sled and knife and shows the knife in adjusted positions about a transverse axis, the adjusted positions being shown by dotted lines;

FIGURE 10 is an enlarged fragmentary perspective view of the means for mounting the coulter disk;

FIGURE 11 is an enlarged fragmentary perspective view showing a portion of the carrier means for mounting the coulter disk and shows the manner in which a vertical support bar is carried thereby;

FIGURE 12 is an enlarged fragmentary transverse sectional view taken substantially upon the plane indicated by section line 12—12 of FIGURE 10 and shows the mounting of one of the support arms for a coulter disk a lowered position of the carrier and support arm being shown by dotted lines.

Referring now to the drawings in detail, it will be seen that there is illustrated in FIGURE 2 a rear portion of a conventional tractor which is referred to in general by the reference numeral 10. The tractor 10 includes a lift arm mechanism generally referred to by the numeral 12, the lift arm mechanism having secured thereto

r vertical movement a conventional tool bar **14**. The ol bar **14** extends transversely of the tractor **10** at the ar thereof and projects to both sides thereof. The ol bar **14** supports a plow assembly which is generally ferred to by the numeral **16**.

When the plow assembly **16** is in operation, the tool r **14** is supported, as shown in FIGURES 2 and 3, a pre-termined distance above the surface of the ground by eans of a pair of gauge wheels **18** mounted at opposite ds thereof. Each of the gauge wheels **18** is adjustably cured to the tool bar **14** by means of a clamp **20** which s a sleeve portion **22** in which a vertical portion of a pport **24** for the gauge wheel **18** is positioned. The pport **24** has a horizontal axle **26** on which the gauge ieel **18** is rotatably mounted. The support **24** is ver-ally adjustable with respect to the clamp **20** to facili-e the positioning of the tool bar **14** at the desired op-ating height.

Referring once again to FIGURE 2 in particular, it ll be seen that a plurality of plow units, generally re-rred to by the numeral **28**, are secured to the tool bar . Since these plow units **28** are identical, only one of e plow units **28** will be described in detail hereinafter. Each of the plow units **28** includes a sled generally re-rred to by the numeral **30**, see FIGURES 1, 3 and 5. ie sled **30** is formed from a pair of side plates **32** which minate at their lower edges in opposed inwardly ex-ading runners **34**, see also FIGURE 7. The side plates are secured together at spaced intervals through the e of the spacer sleeves **36** therebetween and bolts **38** tending through the side plates **32** and the spacer sleeves . The opposite ends of the bolts **38** are provided with ts **40** to clamp the assembly together.

The sled **30** is mounted on the tool bar **14** by a mounting ans generally referred to by the numeral **42**. The unting means **42** includes a pair of upstanding legs at the rear of the side plates **32**. The upstanding legs are transversely aligned and have secured thereto fit-gs **46** which support a transverse shaft **48** for pivotal ovement.

A pair of transversely aligned arms **50** extend upward-from the side plates **32** intermediate the ends thereof. e arms **50** have fittings **52** secured to upper portions reof, the fittings **52** being transversely aligned and ng similar to the fittings **46**. A transverse shaft **54** ends between and is rotatably journalled in the fittings

A two-piece clamp assembly, generally referred to by numeral **56**, is secured to the tool bar **14** centrally of sled **30**. The clamp assembly includes a lower bi-cated clamp member **58** and an upper bifurcated clamp mber **60**, the clamp member **58** extending downwardly l forwardly and the clamp member **60** extending gen-lly rearwardly. The clamp members **58** and **60** are ured together by means of a pair of fasteners **62** dis-ed on opposite sides of the tool bar **14**.

A transverse pivot pin **64** extends between the lower tions of the clamp member **58**. The pivot pin **64** sup-ts a lower trailing arm **66**. The lower trailing arm is adjustably received in a fitting **68** which is rigidly ured to the shaft **54**.

The rear part of the clamp member **60** supports a trans-se pivot pin **70**. The pivot pin **70** supports an upper ling arm **72** which is slidably received and normally nped in a fitting **74** which is similar to the fitting **68**. e fitting **74** is clamped on the shaft **48**.

As is best shown in FIGURE 1, the distance between centers of the pivot pins **64** and **70** is normally equal he distance between the centers of the shafts **48** and

When the sled **30** is horizontally mounted, the effec-length of the trailing arms **66** and **72** will be the ie. In this manner a parallelogram linkage is pro-ed so that the movement of the sled **30** is vertical. uld it be desired that the forward end of the sled be slightly above the rear end thereof, then the effective length of the trailing arm **66** will be shortened. On the other hand, should it be desired that the rear end of the sled **30** be elevated above the forward end thereof, then the trailing arm **72** may have its effective length shortened. Of course, the same results can be obtained by lengthening the effective length of the trailing arm **72** in the first instance and lengthening the length of the trailing arm **66** in the second instance.

A support arm **76** extends upwardly and rearwardly from the clamp member **60**. The support arm **76** terminates at its upper end in a transverse sleeve **78**. A rod **80** is provided at the lower end thereof with a fitting **82** which is pivotally connected to the fitting **74**. The rod **80** loosely extends through the sleeve **78**. A lower collar **84** and an upper collar **86** are adjustably positioned on the rod **80** on opposite sides of the sleeve **78**. A lower coil spring **88** is mounted on the rod **80** and extends between the sleeve **78** and the collar **84**. An upper spring **90** is mounted on the rod **80** and extends between the sleeve **78** and the collar **86**. The springs **88** and **90** normally balance each other and serve to support the sled **30** from the tool bar **14**. When the plow unit **28** is in operation, the tool bar **14** is moved downwardly to a point where the sled **30** compressively engages the ground. As a result, the sled **30** moves upwardly with respect to the sleeve **78** and the coil spring **88** is compressed while the coil spring **90** is temporarily relaxed. By so compressing the coil spring **88**, the sled **30** is constantly urged downwardly towards the ground and will follow the contour of the ground. Further, the mounting of the sled **30** is such that in the event the sled **30** should hit a high point as compared to the remainder of the plow assembly, the individual sled **30** may move upwardly to follow the contour of the ground.

The sled **30** is intended to support a variety of different types of tools. The first of these is a pair of coulter disks **92** which are mounted at the forward end of the sled **30**. A support assembly **94**, see FIGURES 10–12, is provided for the coulter disks **92**.

The support assembly **94** includes a support member **96** which is positioned between the forward part of the plates **32** and has depending flanges **98** which are secured to the side plates **32**. The upper part of the support **96** is defined by a pair of upstanding legs **100** and a cross bar **102**. The brace **103** extends between the flanges **98**.

A carrier, generally referred to by the numeral **104** is mounted within the support **96** for guided vertical movement. The carrier **104** is normally fixed and is supported by the support **96**. The carrier **104** includes a generally rectangular frame **106** which is received between the legs **100** and is prevented from twisting thereby. A sleeve **108** extends vertically through the center of the carrier **104**. An adjusting screw **110** is rotatably supported by the cross bar **102** and is threadedly engaged in an internally threaded bore **112** extending through the sleeve **108**. In this manner a carrier **104** is adjustably vertically positioned with respect to the support **96**. A pair of forwardly and downwardly extending support arms **114** are pivotally mounted on the carrier **104** on opposite sides of the sleeve **108**. The support arms **114** each terminate at their forward ends in a stub axle **116** (see FIGURE 10), on which an associated one of the coulter disks **92** is mounted. The support arms **114** are swingable about vertical axes within the carrier **104**. In this manner the angle *and spacing* of the two coulter disks **92** with respect to the direction of movement of the plow assembly **16** may be varied. The support arms **114** are retained in adjusted positions through a pair of braces **118** which are secured to the support arms **114**, see FIGURES 3 and 10, and whose overlapping positions are adjustably secured together by a bolt **120**.

As is best shown in FIGURE 11, the carrier **104** has a pair of rearwardly extending, generally horizontal sleeves **122**. The sleeves **122** are vertically aligned and may have a suitable vertical support bar **124** extending therethrough.

The support bar **124** is secured in place in the sleeves **122** through the use of setscrews **126** carried by the sleeves. The bar **124** may be used to support a planter or other type of implement in an elevated position above the sled **30**.

A knife assembly, generally referred to by the numeral **128**, see FIGURES 1, 3, 5, 7–9, is secured to each of the side plates **32**. Each knife assembly **128** includes an outwardly projecting knife **130** which slopes rearwardly from its associated side plate **32**. Each knife **130** is provided with a forward cutting edge **132**.

The individual knife **130** is secured to its respective side plates **32** by means of an elongated support shaft **134**, see FIGURE 7. The support shaft **134** extends longitudinally of its respective side plate **32** upon the inner face thereof and is provided at the forwad end thereof with a fitting **136**. The fitting **136** includes a transverse pivot member **138** which extends through an opening **140** in the side plate **32** and is retained in an adjusted position by a lock washer **142** and a nut **144**.

A fitting **146** is removably mounted on the rear end of the shaft **134**. The fitting **146** includes a threaded pivot pin portion **148** which extends through a vertical slot **150** in the side plate **32**. A lock washer **152** and a nut **154** retains the fitting **146** in a vertically adjusted position.

The lower part of the side plate **32** is provided with a generally rectangular opening **156** of a size to permit the passage of a sleeve portion **158** formed on an offset end **160** of the knife **130**. The sleeve portion **158** receives the shaft **134** and thus mounts the knife **130** for pivoting about a longitudinal axis.

A cover plate **162** is carried by the offset part **160** of the knife **130** and has a slot **164** receiving the offset part **160**. The plate **162** is normally secured in place against the side of the side plate **32** by a pair of bolts **166** which extends through holes **168** in the side plate **32** and slots **170** in the cover plate **162**. Each bolt **166** is provided with a lock washer **172** and a nut **174**. Through the provision of the slots **170**, the mounting plate **162** may be vertically adjusted so as to retain the knife **130** in a position pivoted about the shaft **134**. The range of these several positions are illustrated in FIGURE 8 by dotted lines.

As is best illustrated in FIGURE 9, the knife **130** is also adjustable about a transverse axis. This is accomplished by pivoting the shaft **134** about the pivot pin **138**. The adjustment is permitted due to the positioning of the pivot pin **148** in the slot **150**.

The upper portion of each of the legs **44** is provided with rearwardly offset parts **176**. A fitting **178** is secured to the outer face of each of the legs **44**. The fittings **178** are aligned and support a tool bar **180** which extends therethrough and which may support a variety of tools. For example, cultivator plows and shovels **182** are clamped to the outer portions of the tool bar **180**. If desired, a third cultivator shovel **182** may be clamped to the tool bar **180** intermediate the side plates **32**. However, a rotary hoe, see FIGURE 1, generally referred to by the numeral **184** is illustrated as being positioned between the side plates **32**.

The rotary hoe **184** includes a clamp **186** which is secured to the tool bar **180** intermediate the side plates **32**. The clamp **186** in turn supports a vertical post **188** carrying a frame **190**. The frame **190** supports a forward shaft **192** and a rear shaft **194**. A pair of widely spaced rotary hoe members **196** are rotatably journalled on the shaft **192**. A centrally located rotary hoe member **198** is mounted on the shaft **194**.

Reference is now had to FIGURE 5 in particular. It will be seen that other cultivator plows or shovels **200** are secured directly to the tool bar **14**. The pattern of these complementary shovels **200** may vary as desired. However, normally at least one of the cultivator shovels will be placed at each end of the tool bar **14** rearwardly of and in alignment with one of the gauge wheels **18** so as to eliminate the tire tread mark thereof.

Although the plow units **28** have been illustrated as being four in number in FIGURE 2 and staggered with respect to the rear wheels of the tractor **10**, when the coulter disks **92** and their supports are removed, the relation of the plow units **28** may be varied so that one of the plow units **28** may be disposed immediately rearwardly of each of the tractor rear wheels.

It will be readily apparent that the sleds **30** are of such a construction whereby any desired type of tool may be supported thereby. Furthermore, because of the particular novel mounting of the sleds **30**, the sleds **30** and the tools carried thereby will follow the contour of the ground thereby obtaining the desired cultivation.

Each of the side plates **32** has a quadrant of a circle removed at the rear thereof as at **202**. The openings **202** are to permit the cultivator shovels **182** to throw soil in against the plant row. In order that the soil may be more uniformly distributed, two rotary hoes **196** can be located between the side plates **32** thus protecting the plants from the impact of the larger masses of soil and at the same time pulverizing and distributing the soil.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A multiple purpose plow comprising a sled, tool mounting means carried by said sled, and means for mounting said sled on a tool bar, said sled mounting means including a clamp adapted to be fixedly mounted on a tool bar, a pair of trailing arms pivotally connected to said clamp, and fittings carried by said sled pivotally connecting said trailing arms to said sled, said sled mounting means including a rod pivotally connected to said sled, an arm fixedly secured to said clamp, a sleeve carried by said arm receiving an intermediate part of said rod, and counter balance springs carried by said rod and engaging opposite ends of said sleeve.

[**2.** A multiple purpose plow comprsing a sled having side plates, ground engaging runners along the lower edges of said side plates, means for mounting said sled on a tool bar, and tool mounting means carried by said side plates, said tool mounting means including a support disposed between forward ends of said side plates, a carrier carried by said support, forwardly extending support arms extending from said carrier, and coulter disks mounted on said support arms.]

3. [The plow of claim **2** wherein] *A multiple purpose plow comprising a sled having side plates, ground engaging runners along the lower edges of said side plates means for mounting said sled on a tool bar, and tool mounting means carried by said side plates, said tool mounting means including a support disposed between forward ends of said side plates, a carrier carried by said support, forwardly extending support arms extending from said carrier, coulter disks mounted on said support arms,* said carrier [is] slidably mounted in said support and means carried by said support for adjusting the vertical position of said carrier to vertically position said coulter disks.

4. [The plow of claim **2** wherein] *A multiple purpose plow comprising a sled having side plates, ground engaging runners along the lower edges of said side plates, means for mounting said sled on a tool bar, and tool mounting means carried by said side plates, said tool mounting means including a support disposed between forward ends of said side plates, a carrier carried by said support, forwardly extending support arms extending from said carrier, coulter disks mounted on one end of said support arms,* said support arms [are] *on the other end thereof* pivotally mounted for pivoting about vertical axes to var

the angle *and spacing* of said coulter disks, and adjustable brace means extending between said support arms.

5. The plow of claim **4** wherein said carrier is slidably mounted in said support, and means carried by said support for adjusting the vertical position of said carrier to vertically position said coulter disks.

[6. A multiple purpose plow comprising a sled having side plates, ground engaging runners along the lower edges of said side plates, means for mounting said sled on a tractor tool bar, a knife extending outwardly from and through a slot in each of said side plates, and mounting means carried by the inside surface of each of said side plates and mounting its respective knife for tilting about a longitudinal axis, fastening means engaging said side plates and knives and fixedly securing the latter in adusted tilted positions.]

[7. A multiple purpose plow comprising a sled having ide plates, ground engaging runners along the lower edges of said side plates, means for mounting said sled on a ractor tool bar, a knife extending outwardly from and hrough a slot in each of said side plates, and mounting neans carried by the inside surface of each of said side lates and mounting its respective knife for tilting about oth longitudinal and transverse axes, fastening means ngaging said side plates and knives and fixedly securing he latter in adjusted tilted positions.]

8. [The plow of claim **6** wherein said knife mounting neans includes] *A multiple purpose plow comprising a led having side plates, ground engaging runners along the ower edges of said side plates, means for mounting said led on a tractor tool bar, a knife extending outwardly om and through a slot in each of said side plates, and ounting means carried by the inside surface of each of id side plates and mounting its respective knife for tilt-g about a longitudinal axis, fastening means engaging id side plates and knives and fixedly securing the latter in djusted tilted positions, said knife mounting means in-uding,* a longitudinal shaft, a first fitting pivotally con-ecting one end of said shaft to a respective one of said de plates, and a second fitting vertically adjustably secur-g the other end of said shaft to a respective one of said le plates.

[9. A multiple purpose plow comprising a sled having le plates, ground engaging runners along the lower edges said side plates, a knife extending outwardly from and rough a slot in each of said side plates, and mounting eans including a bracket pivoted to and carried by the ide surface of each of said side plates and mounting respective knife for tilting about a transverse axis, tening means engaging said side plates and knives and edly securing the latter in adjusted tilted positions.]

10. [The plow of claim **9** wherein] *A multiple purpose ow comprising a sled having side plates, ground engaging nners along the lower edges of said side plates, a knife ending outwardly from and through a slot in each of d side plates, and mounting means including a bracket oted to and carried by the means including a bracket oted to and carried by the inside surface of each of d side plates and mounting its respective knife for tilt-about a transverse axis, fastening means engaging said e plates and knives and fixedly securing the latter in usted tilted positions,* said knife mounting means cludes] *including* a longitudinal shaft, said knife being otally mounted on said shaft.

11. A multiple purpose plow comprising a sled having e plates, ground engaging runners along the lower edges said side plates, means for mounting said sled on a l bar, a knife extending outwardly from and through lot in each of said side plates, and mounting means nied by the inside surface of each of said side plates mounting its respective knife for tilting about longiinal and transverse axes, said knife mounting means uding a longitudinal shaft, a first fitting pivotally conting one end of said shaft to a respective one of said

side plates, and a second fitting vertically adjustably securing the other end of said shaft to a respective one of said side plates, said knife being pivotally mounted on said shaft.

12. A multiple purpose plow comprising:
(a) a sled having side plates, and
(b) tool mounting means carried by said side plates
(c) said tool mounting means including
(d) a support attached to the forward end of said side plates
(e) a carrier carried by said supports,
(f) forwardly extending support arms extending from said carrier, and
(g) coulter disks mounted on one end of said support arms,
(h) said support arms on the other end thereof pivotally mounted for pivoting about vertical axes to vary the angle and spacing of said coulter disk, and
(i) adjustable brace means extending between said support arms.

13. A multiple purpose plow comprising:
(a) a sled having side plates, and
(b) tool mounting means carried by said side plates
(c) said tool mounting means including
(d) a support attached to the forward end of said side plates
(e) a carrier carried by said support
(f) forwardly extending support arms extending from said carrier, and
(g) coulter disks mounted on said support arms,
(h) said carrier slidably mounted in said support, and
(i) means carried by said support for adjusting the vertical position of said carrier to vertically position said coulter disks.

14. A multiple purpose plow comprising:
(a) a sled having side plates, and
(b) tool mounting means carried by said side plates
(c) said tool mounting means including
(d) a support attached to the forward end of said side plates
(e) a carrier carried by said support
(f) forwardly extending support arms extending from said carrier, and
(g) coulter disks mounted on one end of said support arms,
(h) said support arms on the other end thereof pivotally mounted for pivoting about vertical axes to vary the angle and spacing of said coulter disks,
(i) adjustable brace means extending between said support arms,
(j) said carrier slidably mounted in said support, and
(k) means carried by said support for adjusting the vertical position of said carrier to vertically position said coulter disks.

15. An attachment adaptable to be attached to a sled having side plates, said attachment comprising in combination:
(a) a tool mounting means adapted to be attached to said side plates,
(b) said tool mounting means carried by said side plates
(c) said tool mounting means including
(d) a support attached to the forward end of said side plates
(e) a carrier carried by said supports,
(f) forwardly extending support arms extending from said carrier, and
(g) coulter disks mounted on one end of said support arms,
(h) said support arms on the other end thereof pivotally mounted for pivoting about vertical axes to vary the angle and spacing of said coulter disks, and
(i) adjustable brace means extending between said support arms.

16. An attachment adaptable to be attached to a sled

having side plates, said attachment comprising in combination:

(*a*) *a tool mounting means adapted to be attached to said side plates,*

(*b*) *said tool mounting means carried by said side plates*

(*c*) *said tool mounting means including*

(*d*) *a support attached to the forward end of said side plates*

(*e*) *a carrier carried by said support*

(*f*) *forwardly extending support arms extending from said carrier, and*

(*g*) *coulter disks mounted on said support arms,*

(*h*) *said carrier slidably mounted in said support, and*

(*i*) *means carried by said support for adjusting the vertical position of said carrier to vertically position said coulter disks.*

17. An attachment adaptable to be attached to a sled having side plates, said attachment comprising in combination:

(*a*) *a tool mounting means adapted to be attached to said side plates,*

(*b*) *said tool mounting means carried by said side plates*

(*c*) *said tool mounting means including*

(*d*) *a support attached to the forward end of said side plates*

(*e*) *a carrier carried by said support*

(*f*) *forwardly extending support arms extending from said carrier, and*

(*g*) *coulter disks mounted on one end of said support arms,*

(*h*) *said support arms on the other end thereof pivotally mounted for pivoting about vertical axes to vary the angle and spacing of said coulter disks,*

(*i*) *adjustable brace means extending between said support arms,*

(*j*) *said carrier slidably mounted in said support, and*

(*k*) *means carried by said support for adjusting the vertical position of said carrier to vertically position said coulter disks.*

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